

Name	Abbreviation	Formula	Nonpolar/ Polar neutral/ Acidic/ Basic	Essential/ Nonessential
Glycine	gly	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{H} \\ \\ \text{NH}_3^+ \end{array} $	N	N
Alanine	ala	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{CH}_3 \\ \\ \text{NH}_3^+ \end{array} $	N	N
Valine	val	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{C} \begin{array}{l} \nearrow \text{CH}_3 \\ \searrow \text{CH}_3 \end{array} \\ \\ \text{NH}_3^+ \end{array} $	N	E
Leucine	leu	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{C}_2-\text{C} \begin{array}{l} \nearrow \text{CH}_3 \\ \searrow \text{CH}_3 \end{array} \\ \\ \text{NH}_3^+ \end{array} $	N	E
Isoleucine	ile	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{C} \begin{array}{l} \nearrow \text{C}_2-\text{CH}_3 \\ \searrow \text{CH}_3 \end{array} \\ \\ \text{NH}_3^+ \end{array} $	N	E
Proline	pro	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C} \begin{array}{l} \nearrow \text{C}_2 \\ \searrow \text{H}_2\text{N}^+ \end{array} \\ \text{CH}_2 \\ \\ \text{CH}_2 \end{array} $	N	N

Phenylalanine	phe	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{CH}_2-\text{C}_6\text{H}_5 \\ \\ \text{NH}_3^+ \end{array} $	N	E
Tyrosine	tyr	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{CH}_2-\text{C}_6\text{H}_4\text{OH} \\ \\ \text{NH}_3^+ \end{array} $	P	N
Tryptophan	trp	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{CH}_2-\text{C}_8\text{H}_6\text{N} \\ \\ \text{NH}_3^+ \end{array} $	N	E
Histidine	his	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{CH}_2-\text{C}_3\text{H}_3\text{N}_2^+ \\ \\ \text{NH}_3^+ \end{array} $	B	N
Serine	ser	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{CH}_2\text{OH} \\ \\ \text{NH}_3^+ \end{array} $	P	N
Threonine	thr	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{CH}(\text{CH}_3)\text{OH} \\ \\ \text{NH}_3^+ \end{array} $	P	E
Cysteine	cys	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{CH}_2\text{SH} \\ \\ \text{NH}_3^+ \end{array} $	P	N

Methionine	met	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{C}^{\text{H}_2}-\text{C}^{\text{H}_2}-\text{S}-\text{CH}_3 \\ \\ \text{NH}_3^+ \end{array} $	N	E
Lysine	lys	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{C}^{\text{H}_2}-\text{C}^{\text{H}_2}-\text{C}^{\text{H}_2}-\text{C}^{\text{H}_2}-\text{NH}_3^+ \\ \\ \text{NH}_3^+ \end{array} $	B	E
Arginine	arg	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{C}^{\text{H}_2}-\text{C}^{\text{H}_2}-\text{C}^{\text{H}_2}-\text{N}-\text{C}^{\text{NH}_2^+}=\text{NH}_2 \\ \\ \text{NH}_3^+ \end{array} $	B	N
Aspartic acid	asp	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{C}^{\text{H}_2}-\text{COO}^- \\ \\ \text{NH}_3^+ \end{array} $	A	N
Glutamic acid	glu	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{C}^{\text{H}_2}-\text{C}^{\text{H}_2}-\text{COO}^- \\ \\ \text{NH}_3^+ \end{array} $	A	N
Asparagine	asn	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{C}^{\text{H}_2}-\text{CONH}_2 \\ \\ \text{NH}_3^+ \end{array} $	P	N
Glutamine	gln	$ \begin{array}{c} \text{COO}^- \\ \\ \text{H}-\text{C}-\text{C}^{\text{H}_2}-\text{C}^{\text{H}_2}-\text{CONH}_2 \\ \\ \text{NH}_3^+ \end{array} $	P	N